AMERICAN

GAS JOURNAL

Established 1859 *Pioneer of the Gas Industry*

VOL. 124. NO. 5
WHOLE NO. 2561.

NEW YORK, SATURDAY, JANUARY 30, 1926

Subscription, $3 Per Year
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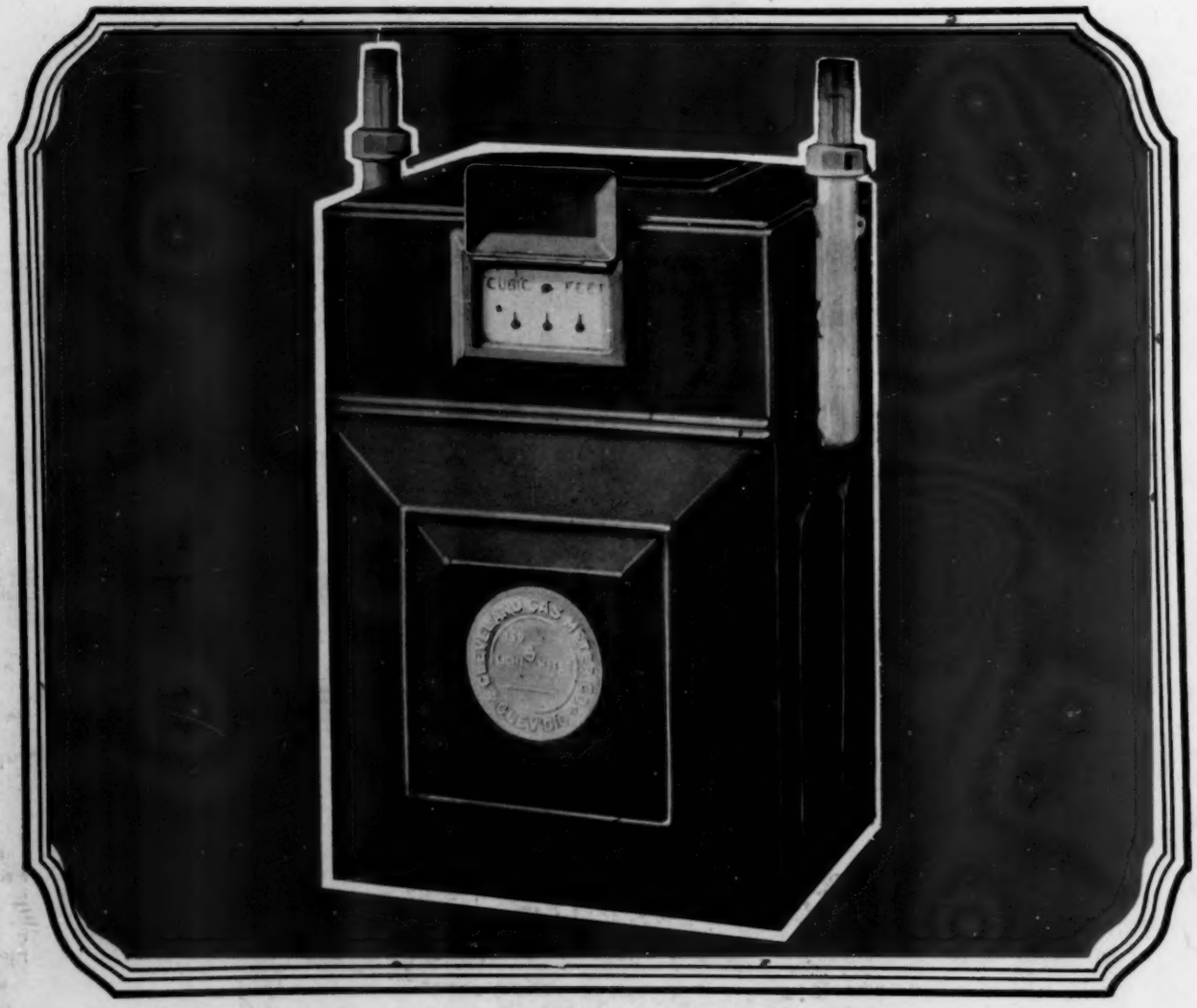

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SIXTY-SEVENTH YEAR

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Subscription $3.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada, $4.00; foreign, $5.00—Single Copies, 10 cents.

AMERICAN GAS JOURNAL, January 30, 1926. Vol. 124. No. 5. Published weekly by American Gas Light Journal, Inc., New York, N. Y. Entered as second-class matter Jan. 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

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Vol. 124. No. 5 NEW YORK, JANUARY 30, 1926 Whole No. 3561

Fuel of the Future--What Shall It Be?

XXIX. Heating operations in the non-ferrous metals industry

Ismar Ginsberg

IN the previous article of this series, which is now concerned with the heating operations that are carried out in the brass industry, we reached a point in our discussion where there were being considered the various types of furnaces that are used in the brass melting process. It appears advisable that the industrial gas engineer and salesman, who is contemplating approaching the brass melter to interest him in gaseous fuel, be familiar with all the different types of furnaces that are employed in the industry, whether these are operated with gaseous fuel or not. Therefore, the discussion, which was left incomplete in the previous article, will be continued and will be concerned as much with furnaces which are operated with coal, coke, oil and electricity, as with gas.

Furnace Classification

It will be recalled that the furnaces that are employed in the brass melting process can be divided into a number of classifications, not only as far as their design and construction are concerned, but also with respect to the fuel that is employed in them. The result is that a large variety of furnaces is thus obtained. As far as the fuel classification is concerned, there are three main groups of furnaces, viz., those that burn solid fuel, those that burn liquid fuel and those that burn gaseous fuel. The electric furnace is in a class by itself. As far as design is concerned, the furnaces are differentiated according to the way in which the heating arrangements are made and also according to the manner in which the molten metal is discharged from them. Thus the furnace may be tapped in order to remove the molten metal. Then, again, the molten metal may be removed from the furnace by tilting it. Finally, there is the type of furnace in which the metal is heated in a crucible and the removal of the molten product is effected by lifting the crucible out of the furnace. The heating arrangement refers to the method which is employed in arranging the burners and also to the character of the draft, that is, whether it is forced or natural.

The Gas Pit Furnace

There has been considered in part the case of the gas pit furnace, which is a furnace that is heated with gas, the metal being contained in crucibles which are placed in a pit surrounded by the flames of the burning fuel. As far as the design of the burners is concerned, this is a matter which is of very varied character, for it is possible to design burners in many different ways. This applies not only to the burners that are employed with gaseous fuel, but also to those that are employed for burning oil fuel. In fact, it is stated that the number of oil burners is legion.

However, there are in general two main classes of burners which are employed in this type of furnace. First, there is the burner in which the air used for combustion purposes is supplied at a comparatively high pressure. The air thus not only burns the oil fuel, but also atomizes the latter. Then there is the type which employs air at low pressure for combustion purposes only, the oil being pumped through the burner at a comparatively high pressure.

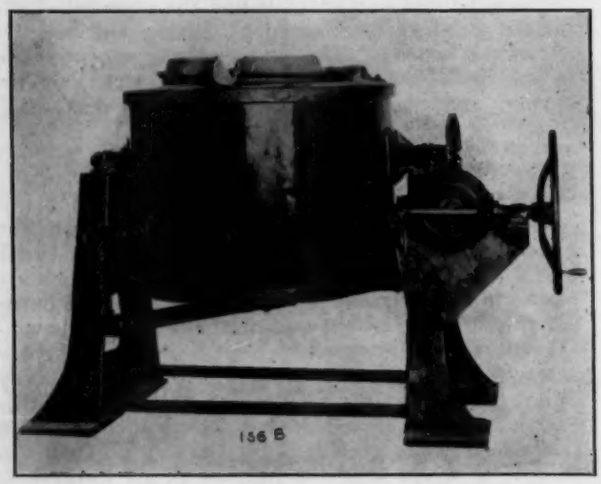
Preheating Arrangements

In some furnaces the air that is used for burning the fuel—and this applies to gaseous fuel as well as to liquid fuel—is first made to pass through a tube or pipe which is led through the furnace itself. In

this manner the combustion air is preheated. Then, again, the air may be passed through a hollow shell surrounding the furnace or through a number of bends in the inlet pipe, also for the purpose of preheating it. As far as oil is concerned, it is seldom preheated before being burned, and then only to make it more liquid in the winter time so that the pump may handle it more easily. On the other hand, gaseous fuel may be preheated as well as the combustion air, provided the ingredients of the fuel are not made to suffer because of the high temperature with which they come in contact. Thus, if the gas contains large proportions of heavy hydrocarbons it is understandable that the high temperature will decompose these gases and result in the deposition of carbon and in a direct and material loss of thermal values. Nothing would, therefore, be gained in preheating such a gas. On the other hand, when the gaseous fuel can be preheated with safety, a considerable gain in thermal efficiency is attained by such procedure.

Importance of Heating Efficiency

In general, the pit furnace that is employed with oil fuel is no different than that used with gaseous fuel, although it follows that in the use of the more



Aluminum Tilting Furnace in Loading Position

expensive fuel greater care must be taken in order to obtain as high as possible a thermal efficiency. This must always be taken into consideration in the use of gaseous fuel. The very fact that gas is being employed as an industrial fuel in some particular operation connotes that the thermal efficiency of that operation has been materially increased over what it used to be before gaseous fuel was adopted. It is in this manner that gas plays its most important role in the industrial field, not merely competing with and supplanting other fuels and gaining business for itself in this way, but actually effecting efficiencies in the heating operation which were not thought worth while before, because of the cheapness of the fuel employed. Thus in this way it does its share in the conservation of the earth's resources and in their use in a more effective and hence more economical manner. The author has always considered that even if gas performed no other important function, the influence that it has been exerting in the few years in which it has been bidding for industrial business, in making manufacturers use greater care and skill in their operations and thus reducing losses and wastes, is sufficient to give it a prominent place in the industrial world as a real benefactor and agent in making for greater progress.

Further Details of the Furnace

Thus the pit furnaces that are employed in the melting of brass and that use gaseous fuel are provided with preheaters or some heat regenerative system for making the best possible use of the potential heat contained in the gas. The burners that are employed with city gas consist of tubular rings with three to four tangential openings. It is customary to mix the air and the gas before they enter the ring, the air being supplied by a blower. The shape of the burner tends to give a whirling flame around the crucible that is placed in the furnace. Sometimes the burners are placed at the top of the furnace and the waste gases of combustion are taken out by means of a flue which is located at the bottom of the furnace. This gives a down draft all around the crucible. On the other hand, it is more customary to find the burners located at the lower end of the furnace. In any design of furnace it is necessary to see that the proper means are provided for securing even and complete distribution of the heat so that all parts of the material that is being treated therein will be raised to the required temperature in a uniform manner.

Construction of the Pit Furnace

The pit furnaces are made in a large variety of sizes. Some of the smaller furnaces will hold only 50 to 60 pounds of brass, while some of the larger ones have a capacity of as high as 1,800 pounds. However, the most common size employed is the one that will hold about 200 pounds of the metal. The crucibles will, of course, vary in accordance with the size of the furnace and when the weight of the metal contained in them is not too large they are lifted out of the furnace by means of a pair of tongs, much in the same manner as in the crucible steel furnace. However, when the crucibles are large and the weight of metal contained in them great, then mechanical means must be provided for lifting them out of the furnace and carrying them around the plant. This is done by means of a suitable crane.

The Home-Made Furnace

One particular feature about the pit furnace and the burners that are used in them is that very often they are constructed right on the brass plant itself. As a general rule, this is not a very satisfactory pro-

(Continued on page 98)

Making Neutral Ammonium Sulphate*

Details of process employed in Dutch gas works

D. Stavorinus

IN Europe attempts have been made for some time past to manufacture a high grade, acid-free sulphate of ammonia from ammoniacal liquor, so as to have a product which can compete with synthetic ammonium sulphate, that is, the sulphate made from synthetic ammonia. In fact, in England the situation has become such that it is no longer possible to sell for fertilizer purposes an ammonium sulphate which contains acid and which has consequently a tendency to cake. It is essential that the ammonium sulphate be in such a condition so that it may be readily scattered over the surface of the ground and, of course, this is not possible when the sulphate cakes.

Experiments have been carried out in other countries as well, with the same view in mind, viz.: to produce a sulphate of ammonia which does not contain free acid. The following article is concerned mainly with a description of the method that was evolved in the Amsterdam, Holland, gas works for manufacturing a neutral sulphate of ammonia. This method, which is one of great simplicity, has been used in this gas works with entire success. One interesting feature regarding the method was that it took but a few weeks after it was first installed to become completely successful from the technical and economic standpoint.

Methods for Manufacturing Neutral Ammonia Sulphate

In the manufacture of sulphate of ammonia, free from acid, it is possible to choose from four different methods which are grouped below in four main classifications.

In the first place, there is the method in which neutral ammonia sulphate is manufactured by complete neutralization, a process which is effected in the saturation itself. In the second place, there is the method which involves the washing or covering of the freshly made ammonium sulphate with water or with a solution of ammonia. In the third place, there is the method in which the acid-containing ammonium sulphate is after-treated with gaseous ammonia. Finally, there is the process which involves the mixing of the salt with a solid substance possessing an alkaline reaction.

Neutralization

It is possible, if it is desired, to combine the neutralization process with the drying process. Artificial drying is not necessary and as far as Holland is concerned there is as yet only one gas works in that country in which the salt is dried by artificial means. In the Amsterdam gas works it has not been found necessary as yet to have recourse to artificial drying.

If it is desired to manufacture a product which is entirely free from acid it is necessary to have an intimate knowledge of the various chemical and physical properties of the sulphate of ammonia that is made under normal operating conditions. For it must be clear that if such a knowledge is not available the after-treatment of the sulphate for the purpose of neutralizing it, according to one method, can often give results which are entirely unsuccessful when applied in another operation. The character of the crystals of the salt is in this connection of considerable importance and it makes quite a notable difference whether the salt, that is, ammonium sulphate, is manufactured by the distillation of ammonia from ammoniacal liquor and the absorption of these ammoniacal vapors in an open saturator, or in accordance with the so-called semi-direct or direct process by washing the unpurified coal gas with sulphuric acid. As a general rule, the sulphate crystals, which are made by a semi-direct or direct process are smaller than those that are made by the distillation and absorption process, and for this reason these crystals afford a considerably greater resistance to the passage of fluids when they are treated in an after-process with solution or vapors.

After-Treatment with Gaseous Ammonia

This is not the process that is employed in the Amsterdam gas works, but it is one that is generally employed in connection with an artificial drying system. In the literature there may be found examples in which this process is employed without the aid of artificial drying. The process that was used in the Amsterdam works was complete neutralization in the saturator, which is of the first group, and washing and covering the salt, which is of the second group.

In one example in which the after-treatment with gaseous ammonia is applied, the sulphate is taken out of the saturator and then put into a vessel, where the liquor contained in this salt is allowed to drain off. This vessel contains a double bottom, which is arranged in such a way that the salt rests on the upper perforated bottom. The top of the vessel is closed by means of a wooden cover which can be readily removed, and which is also provided with a curved pipe This serves to connect the apparatus with the saturator. As soon as the salt has been filled into this vessel, the cover is put on it and ammoniacal vapors are led into the apparatus through the double bottom. These vapors then penetrate through the moist mass of salt. The excess ammonia, as well as the pyridine vapors, are allowed to escape through the pipe in the cover and thence into the saturator, where they are again absorbed by the acid. However, in most cases, the ammoniacal vapor

(Continued on page 100)

*From Das Gas und Wasserfach, 1925, pages 776-8.

Bituminous Coal in Water Gas Making*

Some practical results with a 50 per cent coke mixture

W. C. Smythe

IN order to get any capacities from the sets consisting of generators without pier construction and a low generator fuel consumption per M., it is necessary to use the blow run method of operation and the real question is how much blow run to use. With a long blow run the set capacities are high and the generator fuel per M. is low, but considerably more oil per M. is used. With the short blow run no extra oil is used, but the generator fuel per M. is high and the set capacity is low. The best economies will be effected by having the blow run of such a length as to balance these conditions. In comparing economies with or without the use of bituminous coal it is necessary to compare the sums of the oil and generator fuel costs.

The B.t.u. of the Gas

We made a series of calculations to determine the B.t.u. of the blow run and blue gas mixture. Knowing the B.t.u. in the blue gas of straight coke operation, the difference between the two enabled us to calculate the extra oil required due to the blow run. For example: The average B.t.u. of the blue gas with straight coke operation was 297 per cu. ft. With soft coal operation the average B.t.u. per cu. ft. of the blow run gas was 134, of the up run blue gas 321 and the back run blue gas 311. The volume of air going through the fire per minute on the blow run was 5,450 cu. ft. The duration of the blow run was 25 seconds. Thus, a total of 2,271 cu. ft. of air was put through the fire on the blow run. An analysis of the blow run gas showed it to contain 26.8 per cent CO, so that the resultant blow run gas from 2,271 cu. ft. of air would amount to approximately 2,610 cu. ft. The machines were making 13,000 cu. ft. per run and using 2.50 gal. of oil per M. Allowing 70 cu. ft. of oil gas per gal., each run contained 2,275 cu. ft. of oil gas. This, subtracted from 13,000, gives 10,725 cu. ft. of blow run gas and blue gas per run, of which 2,610 cu. ft. were blow run gas and, consequently, 8,115 cu. ft. were blue gas; 2,610 cu. ft. at 134 B.t.u. and 8,115 cu. ft. at 316 B.t.u. would give a resultant mixture of blow run and blue gas of 271 B.t.u. per cu. ft. Subtracting this from 297 gives a difference of 26 B.t.u., due to the bituminous coal operation which must be made up by extra oil. If each 1,000 cu. ft. of carburetted water gas contained 825 cu. ft. of blue gas, enough oil would have to be added, when using soft coal, to make up 26x825, or 21,450 B.t.u. With an oil efficiency of 100,000 B.t.u. per gal., this would require .21 gal. of oil extra.

These figures are the result of a test when using 7 per cent of blow run, which is too high. The test showed a saving of 4 lbs. of generator fuel, which does not quite balance the extra oil used. Similar tests with varying percentages of blow run were made and, in our case, the most economical was found to be 4 per cent of the cycle.

Economy of the Soft Coal Operation

It seems to me that some such calculation as the above should be made to determine the economy of bituminous coal operation. It isn't accurate to merely compare oil averages, as there are so many conditions of weather and operation entering into the situation that the oil average will vary from .10 to .15 of a gal. from month to month, any how. Of course, if you could take yearly averages they probably would be comparable, but that is a pretty long wait to find out if you are making any money.

In actual operation we experienced the usual troubles with holes in the fire, but these were not serious up to 60 per cent bituminous. We could run the fire 14 or 15 hours between cleanings before the holes got bad. We tried various methods of cleaning, but finally came back to the one we were using on coke. That is, to make nine or ten runs after coaling to allow the fire to burn down a little bit. Then pull out the dead clinker from the bottom of the fire and allow the hot clinker to drop on the grates. Then go up and bar down the fire around the edges. We have always left a thin bed of clinker on the grates after cleaning. The soft coal clinker was softer in the middle than with coke fuel, but around the edges the clinker was about the same consistency.

Operating the Generator

The coal and coke were mixed in the charging buggies and a charge was dumped into the fire every five or six runs. We tried various shapes of shovels to spread the fuel around the edges of the fire, as this is important. When the holes appeared they were always around the edge and usually arched over, being much larger lower down than on top. They were reamed out with a pipe and then filled with fuel from the center of the fire before the green fuel was charged.

We tried carrying the fires at all levels, but found the best height to be at the bottom of the take-off. If they were higher the fuel would blow over in the carburettor, and if lower, numerous holes appeared.

Taking all things into consideration, the soft coal operation with a 50 per cent mixture of coke does effect a real saving. It requires a great deal more supervision, however, than straight coke operation, and that supervision must be more intelligent.

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*Delivered at the mid-annual meeting of the N. J. Gas Association.

GAS MERCHANDISING

Domestic – Industrial

Ideas for the Man Who Sells

William H. Matlack

GOOD GAS GRAPHS

THE Peoples Gas Light and Coke Company of Chicago, in appealing to the manufacturers of the "Windy City," to use gas for industrial purposes, have worked out some very effective gas graphs, to illustrate how the dependable, controllable, economical, clean gas fuel is gaining ground in the big industrial plants of the city. The illustrations show at a glance that the progressive manufacturers are rapidly turning to "the fuel of the future" and they tell why in a very few words. The whole general layout of the advertisement is such as to make an appeal to the engineer of every industrial plant who sees it and to cause him to ask the gas company "how gas can be advantageously used" in his plant.

WHY NOT TRY THESE SALES STUNTS?

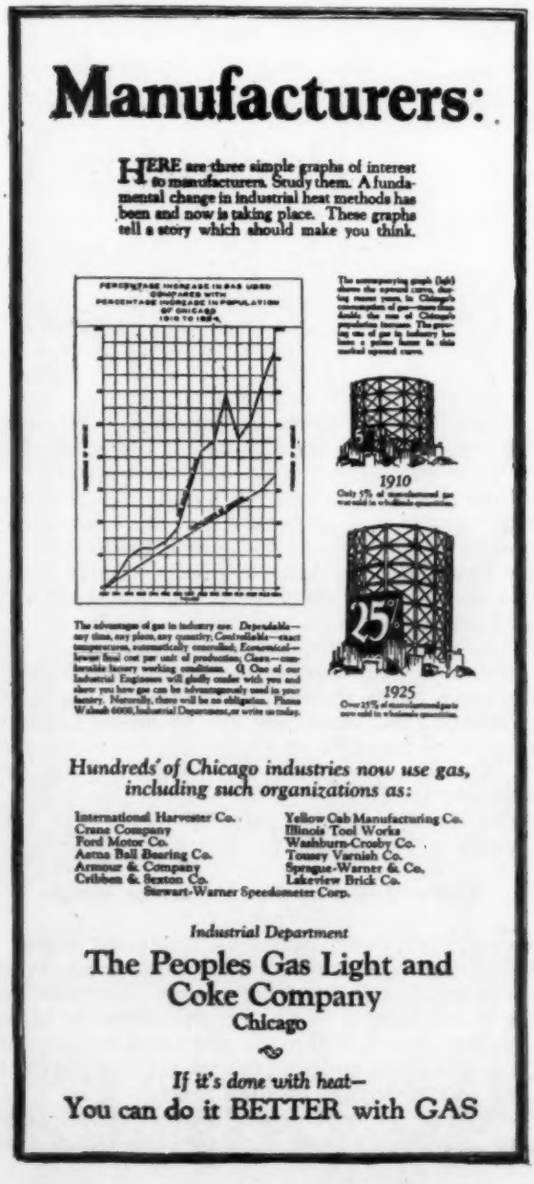
THE "After-Period," after the holidays and after inventory time, usually finds the sales manager a bit fagged on ideas for new sales stunts. He feels that it's too early for the spring sale; it's too late for the Winter Comfort sale. He has just staged a Pre-inventory or After-Christmas sale and he "don't know just what to do next." To the fellow who feels that way, we offer these suggestions:

1—Group your odd numbers. Go through the warehouse. Bring out all the odd numbers you have. Include all appliances, figure the greatest reductions you can possibly make on them, then put on a "Price Reduction sale of odds and ends to make room in your warerooms for incoming stock." Price these appliances in odd cents, say $7.79, $8.09, $11.19, or let your end figures run, 07, 17, 47, 97, etc. The psychology of the odd cent works wonders. We have had folks say during a 99c down payment sale that we had conducted: "Why the 99c; why not an even dollar?" Then they fall in line and wait ten or fifteen minutes for the penny change. That's just old human nature at work!

2—If you are not overburdened with accounts and long-time payments, a "Special Long Term Payment sale" or "an Unusually Low-Down Payment sale" will bring in many customers.

Daily Reduction Sale

3—A "Daily Reduction sale" will also stimulate sales. These sales are usually conducted along this line. Take a given number of appliances—say ranges that are not moving well, and which for illustration we will say have been priced at $150, and which you would be glad to dispose of at cost. The cost we will say is $115. The fact of the reduction is


Manufacturers:
HERE are three simple graphs of interest to manufacturers. Study them. A fundamental change in industrial heat methods has been and now is taking place. These graphs tell a story which should make you think.
1910
25
1925
Hundreds of Chicago industries now use gas, including such organizations as:
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Crane Company
Ford Motor Co.
Aetna Ball Bearing Co.
Armour & Company
Cribben & Sexton Co.
Yellow Cab Manufacturing Co.
Illinois Tool Works
Washburn-Crosby Co.
Tousey Varnish Co.
Sprague-Warner & Co.
Lakeview Brick Co.
Stewart-Warner Speedometer Corp.
Industrial Department
The Peoples Gas Light and Coke Company
Chicago
If it's done with heat—
You can do it BETTER with GAS

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WHY NOT TRY THESE SALES STUNTS?

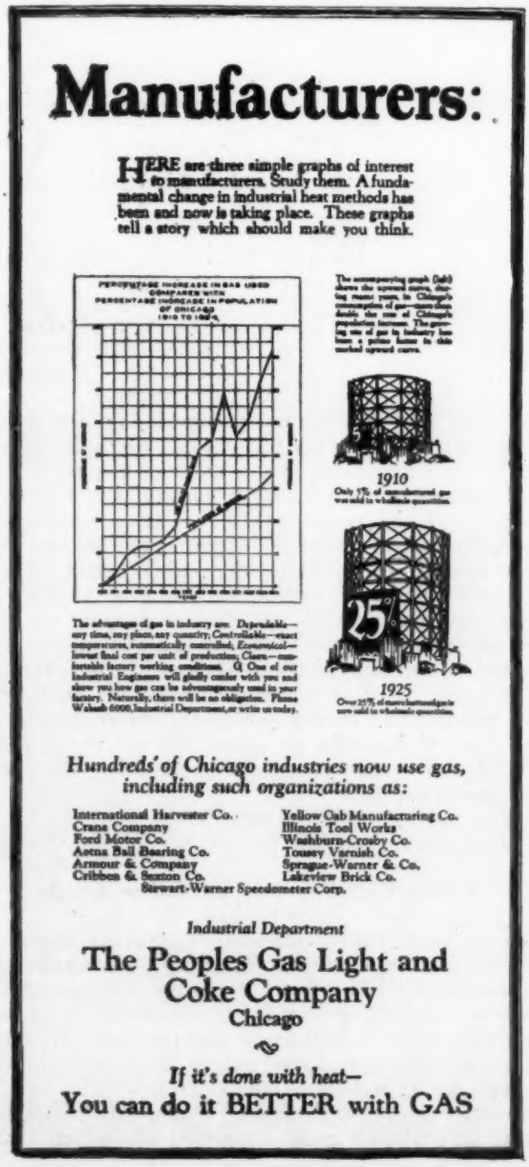
THE "After-Period," after the holidays and after inventory time, usually finds the sales manager a bit fagged on ideas for new sales stunts. He feels that it's too early for the spring sale; it's too late for the Winter Comfort sale. He has just staged a Pre-inventory or After-Christmas sale and he "don't know just what to do next." To the fellow who feels that way, we offer these suggestions:

1—Group your odd numbers. Go through the warehouse. Bring out all the odd numbers you have. Include all appliances, figure the greatest reductions you can possibly make on them, then put on a "Price Reduction sale of odds and ends to make room in your warerooms for incoming stock." Price these appliances in odd cents, say $7.79, $8.09, $11.19, or let your end figures run, 07, 17, 47, 97, etc. The psychology of the odd cent works wonders. We have had folks say during a 99c down payment sale that we had conducted: "Why the 99c; why not an even dollar?" Then they fall in line and wait ten or fifteen minutes for the penny change. That's just old human nature at work!

2—If you are not overburdened with accounts and long-time payments, a "Special Long Term Payment sale" or "an Unusually Low-Down Payment sale" will bring in many customers.

Daily Reduction Sale

3—A "Daily Reduction sale" will also stimulate sales. These sales are usually conducted along this line. Take a given number of appliances—say ranges that are not moving well, and which for illustration we will say have been priced at $150, and which you would be glad to dispose of at cost. The cost we will say is $115. The fact of the reduction is


Manufacturers:
HERE are three simple graphs of interest to manufacturers. Study them. A fundamental change in industrial heat methods has been and now is taking place. These graphs tell a story which should make you think.
1910
25%
1925
Hundreds of Chicago industries now use gas, including such organizations as:
International Harvester Co.
Crane Company
Ford Motor Co.
Aetna Ball Bearing Co.
Armour & Company
Cribben & Sexton Co.
Yellow Cab Manufacturing Co.
Illinois Tool Works
Washburn-Crosby Co.
Tousey Varnish Co.
Sprague-Warner & Co.
Lakeview Brick Co.
Stewart-Warner Speedometer Corp.
Industrial Department
The Peoples Gas Light and Coke Company
Chicago
If it's done with heat—
You can do it BETTER with GAS

then advertised and it is also stated that this reduction will take place at the rate of, say, $5 each day during the period of a week. The advertisements should lay great stress on the fact that only a given number of appliances are offered during the sale and that if buying is not done at once the customer may be disappointed.

4—"A Half-Day sale" is another one that stimulates trade. In this case a substantial reduction is made on certain appliances for one week to morning purchasers (before 12 o'clock, noon). This morning sale idea comes from the department stores' hourly sale and it is productive.

One Day Sale

5—"A One Day sale," usually Monday, has been employed to good advantage. In this case the reduction is made for one day only, Monday, and is so advertised in the Sunday papers. When a one day sale is conducted all prospective customers for the featured appliance should be advised of the special sale. Prospect cards should be gone over and the salesmen should call upon the prospect and advise them of the sale, while other prospects should be called on the telephone and advised of the special one day offer.

Any one of the above sales will build up your sales curve, provided they are planned to tie-in with windows, store, trucks, etc., direct and newspaper advertising. A great many sales fall flat for the simple reason that plans are not complete. The store is not made to look as if a sale were going on; the windows are neglected and no banners are displayed on the company's trucks or wagons.

Follow up the example of the department store! Next time there is a sale, step in and look them over, note how merchandise is displayed, how new price tickets are attached to each article, see how the window display, company delivery trucks and advertising all tie-in. There's the idea—all together and all go over!

Perfume Vs. Gas Ranges

Who is to blame for existing public opinion?

John H. Hartog

Portland, Oregon

ARE gas companies to blame for the lack of appreciation on the part of the public of the attractiveness of the modern gas range?

Have gas companies been so anxious in the past to get any old appliance in that they have unconsciously created a prejudice against gas ranges which now has to be overcome at great expense, tremendous effort and in the face of losing a share of this legitimate business to the electric people?

Time was when the purchase of a gas range represented one of the smallest outlays in the furnishing of a home. Not so many years ago the husband of the middle class would shudder at the suggestion on the part of his wife to spend $50 for a gas range. His idea of a gas range was something that could be bought for $18.

Why did this opinion prevail?

Who was responsible for it?

Public Will Pay for Attractive Article

Some may think that this statement about the public's idea is exaggerated, but those who have felt the competition of the electric range so tremendously have been educated by this very competition to know that the public is willing to pay more for an article that is attractive and well put up, such as the electric range was, especially at the outset.

While recently in the East I perused a Philadelphia paper and clipped from same two ads which I have carried with me ever since for the very purpose of putting this matter, through one of the gas magazines, before the managers of the commercial departments of our fellow companies.

The Wanamaker Ad.

One was an ad. of Wanamaker's, in which is told about the wonderful qualities of "Hamman Bouquet," obtainable exclusively at Wanamaker's, costing "$5 to $18 in plain bottles and $7.75 to **$28** in fancy bottles." The above is the exact wording. Alongside of that I found an ad. offering a "Victory Cabinet Gas Range" at $27.75, with "enamel splasher and drip pan and a 16-inch broiler pan," and, mind you, "connected free within the city limits of Camden, where fuel oil runs to kitchen."

This tells the whole story! This is what the Philadelphia public is being regaled on, that a gas range on which they get three meals a day, or say a thousand meals a year, or in ten years ten thousand meals, is worth 25 cents less than a bottle of perfume which lasts—well, you know.

An Upsidedown World!

It looks like an upsidedown world, where one can sell a little bottle of perfume for $28 and has to take

(Continued on page 96)

INDUSTRIAL GAS LESSONS

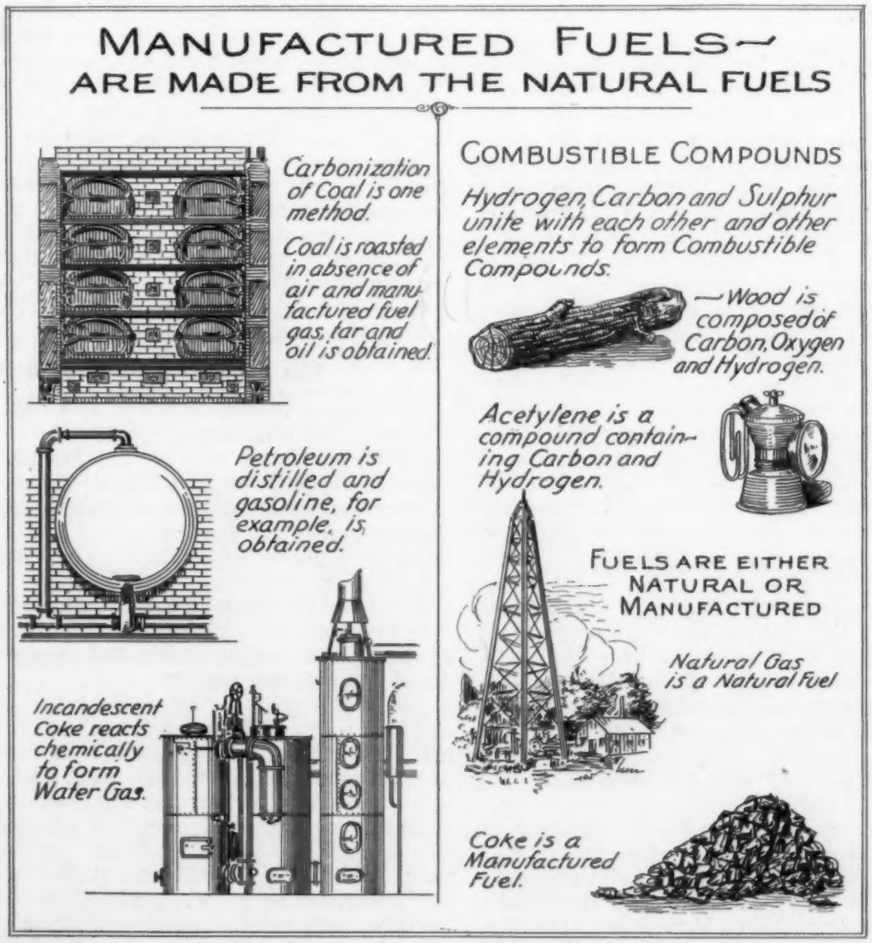
IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 105

Combustion

Combustible Elements Combined in Fuels

The combustible elements have been indicated to be hydrogen, carbon and sulphur. These elements are not generally found in the uncombined form in fuels. Thus, while coal is principally carbon, nevertheless, it contains other compounds as well, which are formed of carbon and hydrogen as well as sulphur and sometimes nitrogen. The gas which we are most familiar with contains both hydrogen and carbon and also a very small amount of sulphur, but the elements are in the combined condition. Natural gas, for example, contains mostly methane, which is a combination of carbon and hydrogen, four parts of the hydrogen to one part of the carbon, the formula of the gas being CH_4. Sulphur, while it is generally considered as a combustible element, is present in such small amounts in the various fuels that for all purposes it is just as well to consider the active combustible elements as merely two in number, viz., hydrogen and carbon. This simplifies the chemistry of the combustion reactions.


MANUFACTURED FUELS—
ARE MADE FROM THE NATURAL FUELS
Carbonization of Coal is one method.
Coal is roasted in absence of air and manufactured fuel gas, tar and oil is obtained.
Petroleum is distilled and gasoline, for example, is obtained.
Incandescent Coke reacts chemically to form Water Gas.
COMBUSTIBLE COMPOUNDS
Hydrogen, Carbon and Sulphur unite with each other and other elements to form Combustible Compounds.
—Wood is composed of Carbon, Oxygen and Hydrogen.
Acetylene is a compound containing Carbon and Hydrogen.
FUELS ARE EITHER NATURAL OR MANUFACTURED
Natural Gas is a Natural Fuel
Coke is a Manufactured Fuel.

Before leaving the general definition of combustion it must be added that from the strictly chemical standpoint and in its broadest light combustion is not limited to combinations that take place between the combustible element and oxygen, but may be applied as well to the union that takes place between any two elements with the evolution of light and heat. Thus, for example, hydrogen will unite with chlorine gas to give hydrochloric or muriatic acid. Metals such as antimony and copper will burn in chlorine. These are combustions. But for our purpose we may forget entirely this broad definition of combustion.

Selling Gas for Industrial Purposes*

The "high spots" briefly reviewed

J. P. Leinroth

Public Service Electric & Gas Company, Newark, N. J.

I BELIEVE any one present who has given the matter any thought at all is agreed that the characteristics of the industrial gas load make it a most important load for the gas companies to acquire. I believe also that there will be little opposition to the statement that adding industrial gas business to our lines will tend to increase our sales per meter, improve our load factors and reduce fixed charges per unit of gas sold. You have also heard a lot about the possibilities of the industrial gas business. The recent report of the Policy Committee of the Industrial Gas Section of the American Gas Association states that "Actual surveys recently made in the city of Syracuse, N. Y., and in the States of New Jersey and Illinois, show that the potential industrial gas business in those territories is from 100 to 300 per cent of the present total sales." Leaders of the industry have been pointing these facts out at every turn and every year more stress seems to be put on the great possibilities for the sale of gas to industries. It seems, therefore, needless for me to dwell further on the necessity of obtaining industrial gas business.

How Should We Proceed?

Granted that we desire this business, how should we proceed to get it? Surely we will not get this load by waiting for it to come to us. This is a highly competitive field and one which calls for salesmanship of the highest order, and if we are to be successful in adding it to our lines we must solicit it in a most aggressive manner. The time for action is now. We must either go forward or backward. We cannot stand still.

This element of competition is not exactly new to the gas man, but it may be pertinent to ask at this point whether the importance of the sales phase of the gas business is really recognized to the extent that it is in other competitive industries. The upbuilding of our load is certainly worthy of the most careful and earnest consideration; the acquiring of this most desirable business is worth a maximum of effort, time and money. But are we doing all we should do to get it? If not, what should we do? These are questions which we should all take seriously. Certainly we need better defined sales plans for selling gas for industrial purposes than we have had in the past. We have seen since the opening of the twentieth century a phenomenal industrial growth and great advances have been made in scientific production. Today we are confronted with a great marketing problem and must attack this problem with the same weapons that have been shown to be so successful in the field of production—the application of scientific methods.

Gas Executives Must Be Sold

Before any of our efforts in this direction will be successful the gas company managers and executives must be absolutely sold on the desirability and the importance of this load. This is the starting point. If they themselves do not see in the proper light the industrial gas problem, then any effort to get this business is doomed to failure. They should learn of the great possibilities of this business by personally visiting installations, talking to prospects and getting first hand information. Their enthusiasm should permeate their organization and they should understand the problem clearly.

The first thing that naturally comes up is, where and how to start. How much business is there? How can I get it? The progressive sales manager, when marketing a new commodity, makes a thorough survey of the field to determine the amount of potential business available. He then analyzes each particular field of potential business. In this procedure the gas industry is no different from any other which has a marketing problem, and if the gas industry is to be successful it must apply the same fundamental principles of marketing. The amount of potential business can only be had by visiting each industrial plant in your territory and getting from

(Continued on page 102)

*Read at the mid-annual meeting of the New Jersey Gas Association.

As The Journal Views It

GAS AND THE COAL CRISIS

It may be that the gas man is pretty tired of having his attention called again and again to the coal crisis and to the part gas should and must play, if not now, in the immediate future, in acquiring the business that the anthracite coal industry has been so foolhardy as to have antagonized and practically to have lost permanently. It may be that the gas man has been preached to along these lines ad nauseum. All this may be true, but, nevertheless, it remains a fact that in certain localities there does not yet seem to be the slightest sign that the gas company is at all aware of the conditions that exist in the house heating field today, or that it is taking any steps or, in fact, is desirous at all of securing any of this business.

It, therefore, seems to us that this subject is of great importance and cannot be over-emphasized. It appears that certain gas companies, particularly those of smaller size, who have not as yet seriously studied the house heating field, have not as yet the proper conception of the opportunity that has been offered to the gas industry to obtain business which can be profitable, when properly administered, and which can be acquired without any undue disturbance in the load and operating conditions. It is a fact—taking everything into consideration, particularly the reluctance on the part of the gas company to acquire a large winter load without any corresponding summer load to take care of equipment which would otherwise be idle during the warmer seasons of the year—it is a fact, we say, that the gas industry in certain parts of the country has not realized the importance of the situation and the opportunity that is offered the gas industry now to obtain a real and permanent foothold in the house heating field.

In large cities where, perforce, soft coal is now being used in the place of the unobtainable anthracite, experience has already shown the great disadvantages that are incurred when bituminous coal is used for house and building heating purposes. Very recently the merchants of perhaps the most famous shopping street in the world protested vigorously against the use of soft coal and indicated that continuance of its use will cause a loss of millions of dollars in spoiled merchandise. The effect of soft coal on the atmosphere is evident to anyone who has lived in a large city like New York, where there has been practically no soft coal used at all in the past, and where the atmosphere has always been perfectly clear. The conditions now are such as to remind one of the stories told about London and its fogs, which are said to be induced in great part by the presence of smoke particles in the air.

There can be no doubt but that soft coal cannot take the place of anthracite for house heat. The smoke, the dirt and filth, the inefficiency of combustion and the difficulty in firing all preclude its use in the home and in office and other large buildings except in a case of emergency as at present. And hence we find all sorts of propositions and suggestions made by people who do not understand the real character of fuels and who are anxious only to have their ideas appear in print. Not long ago such a suggestion was made in regard to the use of electricity as generated from water power for the heating of homes and buildings.

Gas is the only fuel that can take the place of anthracite coal for this purpose and all the other suggestions are mere flights of the imagination and efforts on the part of the people to solve the problem, which is, indeed, a difficult one, and of which they are not properly conversant. But these suggestions show the line of thought in the people's mind, and it is up to the gas industry to direct that thought to gas. For gas is the fuel that will eventually find extensive use in heating houses and buildings. It is only a question of the proper rate and the use of properly designed equipment.

As long as the anthracite coal industry continues to disregard the best interests of the public—and it must be clear now that it cannot continue to do so any longer with the same impunity that it has enjoyed in the past—the field is open to other fuels, and surely gas, which has so many advantages as a fuel, should not allow itself to be out-maneuvered and shunted to one side by other less suitable fuels.

It is the duty of the gas industry to get as much of this business as they can profitably and conveniently carry, and furthermore, to see to it that whatever disqualifying conditions now exist are removed, so that eventually gas will come into its own as the most advantageous and in the long run most useful fuel for house heating.

PERFUME VS. GAS RANGES

(Continued from page 92)

$27.75 for the chief appliance and ornament in the housewife's workshop!

I am glad that in picking up any Portland paper one can see perfume advertised for 98 cents and a gas range for $175. That's more like it.

That Philadelphia is not the only Eastern city where these old-fashioned methods are still in vogue is proven by another ad. which I cut from a New York paper, showing a very attractive cabinet range. "These modern cabinet ranges not only help your apartments, but also increase their value." (Just imagine that!) The ad. continued: "A-B Gas Ranges, maintained in perfect operation free of cost, rust-proof ovens, asbestos oven walls, American Gas Association specifications, fifteen models to choose from, **$15 up.** J. R. ..... Company, ... West ..... street."

Under the picture of the range, it says, "This enameled A-B Gas Range in lots of six or more, $27.25 each."

In other words, New York goes Philadelphia 50 cents better and beats the perfume price 75 cents, besides the "fifty models to choose from at $15 each."

The Results

Is it any wonder that the gas company finds itself in deep water when electric competition comes into apartment buildings where the tenants have been tormented by the necessity of getting a meal on a range that sold "new" for $15, "installed free and maintained in perfect operation free of cost."

Now for the remedy! It is easy enough to criticise and find fault. Is there a remedy? Yes, the remedy is partly found in the gas companies being in the appliance business (at a profit), leading out with the very best appliances which can be found, and advertising the prices, thereby encouraging the dealers and showing them that higher-priced articles, ranges that are worth while, can actually be sold.

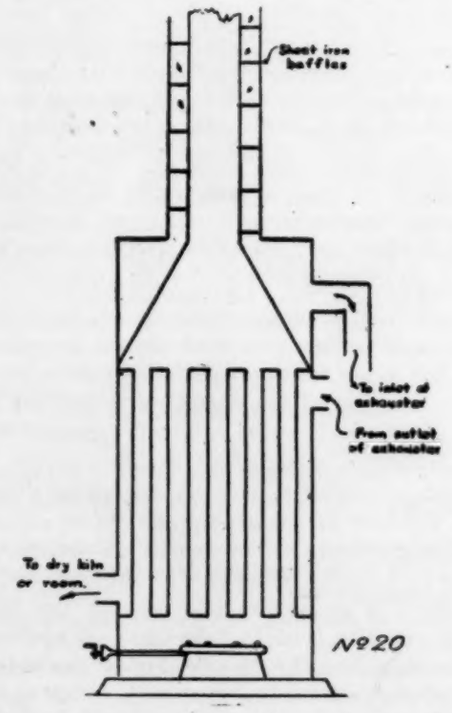
Educating the Public

It does not take a mathematician or even a Philadelphia lawyer, whether he uses Hamman Bouquet or not, to find out that those Philadelphia and New York advertisers would rather sell $150 ranges than $27 stoves. Then, why don't they do it? Why are they content to educate the public in the belief that any old thing will do and that a little bottle of perfume is worth more than a gas range? Simply because they imagine that the public would not buy the $100 or $150 range. This, however, is simply ignorance on their part, for which the gas company is to blame. Just as soon as the dealer sees the advertisement of the gas company quoting the higher-priced ranges, the dealer will take courage and follow suit, realizing there is something in the business after all.

RECUPERATOR

Wrinkle No. 20

BY adding a rather inexpensive device to certain types of gas heaters it is possible to increase their operating efficiency from 20 to 50 per cent. This device may be termed a "recuperator," although it does not require any difficult construction or the expenditure of a large amount of money. It surrounds the stack and its mission is to recover a large percentage of the stack losses. This is accomplished by installing a pipe from 4 to



8 inches larger in diameter than the regular vent, within which are placed horizontal baffles extending only one-half way around, against and conforming to the outer periphery of the inner pipe.

A recuperator of this type will prove most successful where a fan or blower is used in connection with the heating system. In this manner the inlet air is drawn downward over the heated stack and then may be preheated prior to introducing into the heated chamber, such as a dry room, kiln, etc.

To be effective, the length of such a recuperator should be at least ten times the diameter of the heated stack. Twice this where obtainable is desirable.

PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

LIQUID PURIFICATION

A RATHER complete discussion of liquid purification is contained in an article published in the November, 1925, issue of the French Journal, Chimie et Industrie.

In this article there is first discussed the general economical and industrial aspects of liquid purification, most of the information being derived from American sources. Particular attention is paid to the purification of coke oven gas and the various technical and industrial difficulties surrounding the purification of the gas are described. General details are given as well on various liquid purification processes as applied to coal gas, and particular attention is paid to the American process of purifying coal gas by means of a solution of carbonate of soda. The theory of this process and the various chemical reactions involved are described in detail, as well as the different apparatus used. The technical side of the process itself is given considerable space; the effects of variation of temperature, concentration of solution and speed of circulation of these solutions through the tower are described. Results are also given particularly in regard to the consumption of soda, power, labor and maintenance, etc. The latter part of the article is concerned with the recovery of sulphur from gas and the various reactions that are concerned in the process which not only purifies the gas, but also makes it possible to recover the sulphur, that was originally contained in it, in combined form.

EFFICIENT RECOVERY OF AMMONIA IN GAS WORKS

THE elevated temperature and short time of contact in the earlier part of the ammonia condensation system of a gas works favor the production of the normal carbonate $(NH_4)_2CO_3$ in the condensate. In the liquor from the washer the acid carbonate is shown to preponderate, while the sulphide condensed is exclusively $(NH_4)_2S$. The vapor pressure-temperature curves of solutions containing 2 per cent of ammonia combined with various proportions of carbonic acid ranging from that corresponding to $(NH_4)_2CO_3$ to the ratio in the acid salt $(NH_4)HCO_3$ are given. Increase in carbon dioxide content within these limits causes increase in the vapor tension and all the curves except that of the normal salt show discontinuities.

The vapor pressure of the normal salt is less than that of an equivalent ammonium hydroxide solution at temperatures below 47 degrees. The curves of solutions of intermediate composition cut this curve at successively lower temperatures. The acid carbonate solution boils at 55.2 degrees, the normal at 84.3 degrees. By the help of the vapor pressure curves of ammonium hydroxide solution and of water the partial pressures of the three components at any point may be calculated.

The thermal energy consumed in heating solutions of the acid and of the normal carbonate from 17 degrees to 85 degrees is calculated, the former being the greater. On heating to above 88.5 degrees the relation is reversed. In the application of these results to conditions in the gas washer the range of temperature to be considered is from 10 degrees to 35 degrees.

A series of curves is constructed showing the relation between ammonia partial pressure and water vapor partial pressure within these temperature limits for ammonium hydroxide solutions containing 1 to 4 per cent NH_3. The vapor tension of ammonia at any point multiplied by 100 gives the ammonia content of the gas in grams per 100 cub. m. in equilibrium with the ammonia solution of concentration indicated by the point.

In order to modify these curves to the conditions found in practice a series of factors were experimentally determined for varying ratios of ammonia to carbon dioxide in the solution up to 1 :2.7, corresponding to the compound $(NH_4)HCO_3$. These factors being also depicted graphically, it is possible by a determination of the ammonia content of the gas entering the washer and of the ammonia carbon dioxide ratio in the liquor running out, the inlet gas temperature also being known, to read off the maximum concentration of liquor which can be made under the conditions. The supply of wash water can be regulated accordingly.—(Gas- u. Wasserf., 1925, 68, 651-655, 671-675, 687-691).

LOW TEMPERATURE CARBONIZATION

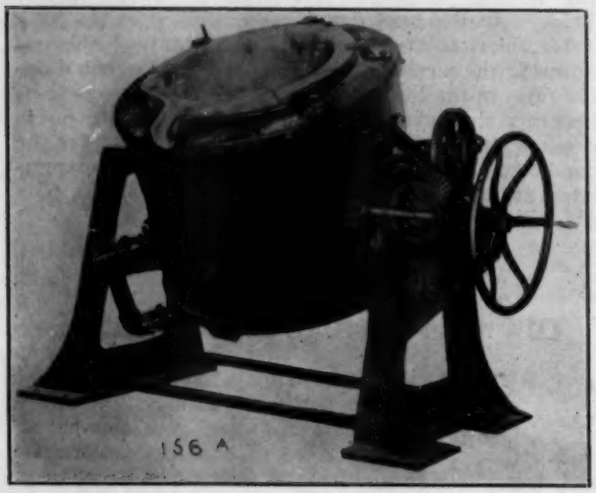
CRUSHED and blended coals have been carbonized up to 650 degrees, without previous briquetting, in cast iron vertical retorts based on Scottish shale practice. A satisfactory smokeless fuel, a reasonable yield of oil, and no more than a reasonable amount of breeze have been produced. The cast iron is such that it resists this temperature without growth. Attempts to briquette coal without a binder at a pressure of two tons per sq. in. and at elevated temperatures failed owing to the decomposition of coal at temperatures above 220 degrees. The Lessing process (E. P. 130,362, J., 1919, 676a) is adaptable to low temperature tars but the throughput is small. The tar may be distilled up to 170 degrees to give a spirit which may be used as a precipitant in the process.—(Rep. of Fuel Res. Bd., 1924, 34-43).

THE FUEL OF THE FUTURE—WHAT SHALL IT BE?

(Continued from page 88)

cedure, although it will sometimes be found that there is a man around the plant who understands how to build furnace and burners correctly. But this is a very rare occurrence and hence the practice is to be discouraged. It is not because it is desired that the brass maker buy his furnace and equipment from a furnace maker rather than make it himself, but simply because it stands to reason that the brass melter, whose business it is to manufacture brass castings and the like, cannot be expected to design a furnace which will be as efficient as the one that is made by the furnace maker whose business it is to construct furnaces and burners.

The gas engineer has found it a rather common practice for the plant in which he is trying to introduce his fuel to build its own furnaces. He is sometimes asked and expected to apply his fuel to the crudely constructed affair that is termed a furnace and that has perhaps been used for years with most inefficient results. Of course, he cannot obtain good results with such an apparatus, and in fact should not make any attempt to do so. He should insist on installing a furnace whose operation he knows will give him the desired results. The matter of rebuilding the old furnace is one that should not be undertaken except as a last resort, for it is very doubtful whether it is possible in most cases to effect the proper changes in the furnace in order to make it



Aluminum Tilting Furnace in Tilted Position

sufficiently efficient to be operated with gas. The crux of the entire situation is that gas will not give good results, be economical and come up to the expectations of the prospectice industrial user and of the salesman and gas company, as well, unless it is burned in a properly designed and constructed furnace. It is the old story that even a good workman cannot produce the best results with poor tools. Gas is a most efficient fuel, but it cannot give proper results when it is burned in a makeshift furnace which does not permit it to develop the good qualities for which it is noted.

Tilting Furnaces

The next type of furnace which is of interest and importance to the brass melting industry is known as the tilting furnace. This furnace is built in the form of a crucible which holds the metal and which can be tilted so that the molten metal charge can be readily poured out of the apparatus. Such a furnace may be heated with gas, oil or coke under forced draft.

The drum that forms the furnace is lined with fire brick and is placed on trunnions so that it can be readily tilted. A suitable mechanism is provided for this purpose. The crucible itself, which holds the metal, is wedged into this drum, and rests on a special refractory crucible block in the bottom of the drum. The crucible is made with a projecting lip or spout which aids in the pouring of the molten metal.

This is a type of furnace which possesses certain mechanical advantages over the straight pit furnace, for it is a very easy matter to tilt the furnace and remove the metal into a traveling ladle, which is then carried to the mold. The mechanical operation of this type of furnace avoids the necessity of lifting the crucibles out of the hot pit furnace, which is always a laborious and uncomfortable procedure. The furnaces themselves stand above the ground and if the furnace is large it is surrounded with an elevated charging platform, which renders it more convenient to charge the metal into the furnace. The capacity of the furnace may be as little as 180 pounds of molten metal or as much as 1,500 pounds, but most of them hold between 375 and 600 pounds of metal.

Tilting Forced Draft Coke Furnaces

This is a type of furnace which is used quite extensively in the brass industry. It is fired with coke fuel and in some cases it has been found that the coke may be mixed with some coal, as much as 50 per cent, the firing then being carried out with a mixed coke-coal fuel. Furnaces of this type do not use coal alone.

There are several makes of these furnaces. In general, the body of the furnace is in the form of a cylinder; in a few it is square. Sheet iron is used for making the shell of the furnace and this is then lined with fire brick and is also provided with a panlike sheet iron ashpit which makes a tight joint with the body of the furnace when the furnace is in the melting position. In pouring the molten metal from the furnace the body is lifted away from the ash pit. In other designs of furnace the ash pit is itself dropped away from the main portion of the furnace and is then raised back to its normal position after the discharging process has been completed. Grate bars are provided at the bottom of the furnace on which the crucible rests. The crucible is specially constructed to fit this type of furnace and is provided

with a lip or spout to facilitate the pouring of the metal.

Burning the Fuel

The coke fuel is placed on the grate bars between the bottom of the crucible, which does not rest directly on these bars, but on a block of refractory material placed on the bars. The coke is burned by forced draft and at times the air used for combustion is preheated by passing it between the furnace shell and an outer casing.

This type of furnace would appear to be well adapted to being converted into a gas-fired furnace, particularly when it is equipped with an air preheating device. It appears essential in this field that the air at least and wherever possible the gas as well be preheated so as to save some of the heat that would otherwise go to waste up the stack. This fact cannot be emphasized too strongly and is an essential condition affecting the use of gas in all high temperature operations. For it is understandable that in order to maintain the high temperature within the furnace it is necessary for the flue gases to leave at a temperature which is at least 100 to 200 degrees in excess of the furnace. This, then, means that there is considerable heat present in these gases and in fact more than can be hoped to be completely recovered. An attempt must, however, be made to utilize as much as possible of this heat so that the economy of the process may be as great as possible.

Feeding the Charge

In the tilting type of furnace a refractory funnel arrangement is employed for feeding the charge into the crucible and this funnel is placed directly over the crucible. Here, again, another opportunity is afforded for saving some of the excess heat which goes to waste in the flue gases. The latter are made to pass through the charge while in the feeder so that temperature of the fuel is materially increased before it is ready to be charged into the furnace. Another system which seems to be particularly well adapted for use with gaseous fuel is to heat the charge in the feeder to so high a temperature that it melts before being introduced into the furnace for further treatment. This would have the effect of saving very much more of the heat that is present in the waste gases. Furnaces could be built in such a manner that the charge is preheated to the melting point in a chamber which is traversed by the hot gases that come from the main part of the furnace. As said before, the reason why such arrangements are preferred and are indeed necessary when gas is used as fuel is because of the higher cost of the gaseous fuel and the need for using as little of it as possible in the heating operation.

Tilting Oil Furnaces

This is a common type of furnace. The oil is burned in the usual manner by means of an atomizing burner. The crucible is arranged in a pit, but is larger than the ones that are employed in the pit furnace and is provided with suitable devices for emptying the molten charge when it is ready to be poured. There are quite a few variations of these furnaces and they are mostly due to the different ways in which the mechanism for raising the cover of the crucible and for tilting the same is arranged, as well as the manner in which the burners are constructed and arranged in the furnace and size and shape of the combustion chamber.

Open Flame Tilting Furnace

This is a type of furnace which is not provided with a crucible. It consists of a steel shell which is lined with firebrick, fire sand, or other refractory material. This shell is mounted on trunnions so that the furnace can be tilted in order to discharge its molten contents. The flame comes into direct contact with the crucible.

One type of this furnace is made egg-shaped and is mounted horizontally on trunnions. A hole is provided at the end of the shell for the insertion of the burner and there is also another hole at the side for the removal of the products of combustion. The metal is also charged through this hole and the molten metal discharged. Two of these egg shaped affairs may constitute an installation. These are mounted on trunnions and each may be provided with its own burner and charging and discharging door, closed by means of a suitable cover. But the open ends of these furnaces are placed together so that the two chambers communicate with each other.

Continuous Conveying Oven for Tempering Springs

Heat Economy Effected

This arrangement makes for heat economy, for the reason that the products of combustion in one cham-

ber are made to pass through the other which is not operating and in this manner the metal in the second chamber is heated up before it is melted. The operation is carried out in such a manner that the melt in the first chamber is ready to be poured before the metal has been completely melted in the second chamber, so that after the first chamber is charged again with cold metal and the burner in the second chamber is lighted there is plenty of opportunity for the cold metal to be heated up to quite a high temperature before the burner is lighted again in the first chamber. This type of apparatus is well suited for use with gas when the necessary changes are made in it. Again here the particular advantage is that it affords a possibility of recovering some of the waste heat in the flue gases.

Other types of this apparatus are made in the form of a cylinder which is placed in a horizontal position, or in the shape of a combined cone and sphere, the upper part being conical and serving as the charging hopper and the lower part being spherical and acting as the melting chamber. There is still another type which is in the form of a small reverberatory furnace.

Reverberatory Furnace

This type of brass melting furnace is employed for large productions of the metal. The capacity usually varies from one-half ton to 40 tons. The metal is either tapped out of the furnace or dipped out. It is a type of furnace which is much more common in the iron and steel industry than in the brass industry and in the latter it is used rather for reducing borings and other brass scrap to ingot form than for melting brass for pouring into castings. It is stated that in the navy yards, where large castings such as propellers and the like are being made, this type of furnace is employed. Generally oil or bituminous coal is employed as the fuel. It is not a type of furnace that will be found in the ordinary brass melting foundry into which the gas engineer will venture to sell his fuel, and therefore need not be considered any further in this study.

Cupola Furnaces

This is again a type of furnace that is not much used in brass melting except in the case of shops which are engaged in repair work where there is a cupola available for iron work. Then when an emergency repair job comes up wherein brass must be used, the practice will be to employ the furnace for melting brass. The product that is obtained from this apparatus is generally very impure and must therefore be further refined in a reverberatory furnace. It is understandable that such a furnace does not give the best results and the metal losses are often as high as 8 to 10 per cent.

It is a furnace that is found in junk refineries and it is in keeping with the general inefficiencies prevalent in such establishments that such a furnace should be employed for melting down the brass scrap. There might be a possible outlet here for the gas-fired furnace which would probably soon pay for itself in saving in fuel and in the reduced loss of metal that would be incurred in its use. It is not known whether it is possible to develop this field for gas, but it appears that there might be a possibility of doing something in it and it is surely worth a trial any way.

Inefficiency of the Cupola

It should be brought to the attention of the cupola user that his method of melting brass has been found to be the most difficult of all and the most expensive, while productive of the greatest losses in the metal and resulting in a product of very inferior quality. The use of a gas-fired furnace would enable the junk refiner not only to save money eventually in the operation of the furnace, but would give him a final product of higher quality for which he would be able to receive a greater return.

Before leaving this subject it must be stated that the cupola furnace is used in a number of isolated cases in foundry work, in addition to the junk plants, and this is for the manufacture of sleigh bells. This type of furnace is used for this purpose because of the fact that practically all of the zinc that is in the charge is lost, resulting in a bronze, which, of course, has particular application here in that bronze bells have superior sonorous properties.

(It is to be remarked here that the author has used the Bureau of Mines publication on the American Brass Industry in preparing this article in part.)

MAKING NEUTRAL AMMONIUM SULPHATE

(Continued from page 89)

is conducted in admixture with hot air through the salt which is in a constant state of motion, being contained either in an upright or horizontal dryer. In this case, as well, the waste gases are conducted through the saturator so as to prevent any losses of ammonia.

Mixing with Alkaline Substance

This method, as well as the method described in the fourth and last group as above, is often used for treating ammonium sulphate, which has been made by the semi-direct or direct process. In the neutralization of the acid salt with a solid alkaline substance, the general practice in England at the outset was to employ an extremely finely ground quicklime. The crude salt, which contained approximately 2 per cent moisture and 0.4 per cent free acid, is mixed with approximately 0.4 per cent of pulverized quicklime, the mixing being effected in the dryer for about 20 minutes, and then the salt is dried. Later carbonate of lime was used in place of the quicklime in the proportion of ½ per cent. In this manner there was obtained a finished product, which upon analysis was found to contain 25.4 per cent ammonia, 0.2 per cent water and 0.6 per cent gypsum.

Nevertheless, there is still present the danger of the salt caking, so that in many cases the use of a lime salt is abandoned, and in place thereof anhydrous

soda is employed. When soda is used for this purpose, a finished product is obtained, but with ½ per cent Glauber's salt, which naturally has an effect on the ammonium content.

Nevertheless, this process has the advantage in that ammonium sulphate obtained by the direct process and consisting of fine crystals can be treated therein without any difficulty. However, as soon as the moisture content of the after-treated salt arises above 0.4 per cent, there is danger of caking, a condition which the after-treatment is especially devised to prevent.

Drying in Mechanical Dryers

When the drying process is carried out in mechanical dryers dust very often is formed. This, of course, is a serious disadvantage and it is necessary that steps be taken to counteract it if mechanical drying is to be at all successful. Experience, both in England and France, with mechanical drying, has not been as promising as at first expected and it has generally been necessary to install apparatus in the nature of cyclone separators, through which the warm air, after having passed through sulphate in the dryers, is conducted, and in which the dust is precipitated.

The author has made some experiments with the first two of the before-mentioned methods for manufacturing neutral sulphate and has found that in no case was there any difficulty in making a neutral salt directly in the saturator. Nevertheless, care has to be taken in order to prevent loss of ammonia in the waste gases, for such losses would seriously affect the economy of the process.

Salt of Poor Color

In connection therewith, mention must be made of the great danger of producing a salt which has a bad color. A dark gray color in the sulphate is in no way an infrequent occurrence. Nevertheless, what is to be feared more than this is the formation of berlin blue in the salt, when ammonia cyanide and iron sulphide act upon one another in an alkaline liquor.

Previously, when gas was being made in the Amsterdam works only in horizontal retorts, difficulty was encountered in that the sulphate was pale blue, and under these conditions the greatest of care had to be taken to see that the liquor in the saturator had a rather strong acid reaction. However, the Amsterdam Gas Works has recently been manufacturing coal gas in vertical retorts and under these conditions, due particularly to the lower percentage of cyanide compounds in the gas liquor—the formation of bluish compounds in the saturator has stopped entirely. It therefore follows that in a gas works which is manufacturing gas in a vertical retort installation or a vertical chamber plant, it is possible to work with alkaline liquor in the saturator without any fear of bad results.

Practice in the Amsterdam Gas Works

In the Amsterdam gas works ammonia vapors are drawn through the saturator until the liquor reacts alkaline with methyl orange, then the salt is removed and sent to the centrifuge and centrifuged. The centrifuge has a horizontal axis, so that it cannot be used very well for after-treatment of the salt. This is the reason why neutralization of the salt in this gas works was carried out in the saturator.

It is natural that considerable quantities of ammonia vapors are carried along with the waste gases. For this reason these gases are subjected to condensation. Thus almost all of the ammonia has been recovered in the form of a solution of almost the same concentration as the original crude ammonia liquor. Hence the condensate can be mixed with the crude gas liquor. When the operation is conducted in this manner ammonia losses are not great. The color of the salt obtained is good and it has a normal water content of about 2 per cent, which is reduced a few tenths of one per cent on storage for a short time.

In another part of the gas works there is an installation which produces daily an average of four tons of sulphated ammonia. This product is removed from the saturator by hand and is then thrown into a tank and there the excess liquor contained in the salt is allowed to drain off. The drained salt is then sent to a centrifuge built with a vertical axis and there it is treated with a dilute solution of pure ammonia.

After-Treatment of the Salt

It is not advisable to subject the hot salt to after-treatment, for if this is done it will cake in the centrifuge and form a solid mass. Furthermore, the weakly acid sulphate, when it is introduced into the centrifuge, must not be any hotter than approximately 60 degrees C. For this reason a second draining tank has been provided in this plant, in which the salt is spread out, as soon as the greater part of the mother liquor has been removed after it has been taken out of the saturator.

When the temperature has been lowered sufficiently, which is accomplished within a short space of time, the salt is introduced into the centrifuge and then on centrifuging it distributes uniformly over the surface of the machine. One charge of the centrifuge contains approximately 180 kilograms of the salt. The centrifuging is carried out until all the acid mother liquor, adhering to the salt, has been removed. As soon as no further liquid is seen to run out of the rotating machine through the gutter, a dilute solution of ammonia, which is contained in a tank located about three meters above the level of the centrifuge, is allowed to enter the latter, being uniformly distributed over the surface of the salt by means of a spraying device.

About 13 liters of a solution containing 3.1 per cent of ammonia are used each time. This is somewhat less than the amount required theoretically for saturation of the sulphuric acid adhering to the sulphate. However, the outflowing solution carries along

with it a part of the adhering acid liquor and in this manner its removal is effected without its being neutralized. At any rate, practical experience has proven that the aforementioned amount of ammonia is sufficient for the production of a neutral salt.

Further Treatment of the Salt

Thereafter, the salt is centrifuged until it is entirely dry. The apparatus is then stopped and the sulphate is removed through a bottom opening. The product is still somewhat moist, but it dries very quickly. It has almost a white color, with a slight grayish cast. At times, if there is considerable iron present in the sulphuric acid, it may have a yellowish tint, but this happens but seldom. The crystalline structure of the salt is such that it does not cake on storage or shipment. In fact, it has been found practical to keep the salt for several months and then pack it into sacks without any trouble. The nitrogen content of the salt varies between 20.65 to 21.1 per cent.

The dilute ammonia solution that is used in the after-treatment of the sulphate is made by heating a mixture of ammonia water with milk of lime. In this way a mixture of vapor and almost pure ammonia gas is obtained. The distillation of ammonia is accomplished in a tower. The tank in which the dilute ammonia liquor is stored is made of iron and has a capacity of about one cubic meter. It is provided with a level gauge and a cover.

It is customary to fill the tank with water up to a certain mark and then open the valve on the line which connects the tank with the ammonia distillation tower. Thereat the mixture of steam and ammonia gas enters the tank and is immediately absorbed by the water. After 30 minutes the water will be found to contain the requisite amount of ammonia.

SELLING GAS FOR INDUSTRIAL PURPOSES

(Continued from page 94)

them the amount of competitive fuel used for industrial processes which gas could replace. This survey is of first importance and the sales manager who has not made one has not a clear picture of his selling problem.

Making Cost Studies

The next step consists of analyzing these heat processes more carefully with the idea of making cost studies of them and one of the acid tests for a good industrial man is his ability to make a complete and accurate cost study. The various items entering into the final cost of product should be carefully tabulated in each case. This, of course, takes both time and money, but it is only by such a systematic campaign that the soliciting of this business can be done intelligently. This survey may be made either by your own men or by an outside company. On its completion you will probably find that the processes will fall into four classes:

Four Classes

(a) There will be some processes where gas can be sold at almost any price, due to its inherent advantages. In these cases gas is comparatively easy to introduce.

(b) There will be some processes for which gas cannot be sold, due to the gas rate being too high. As an aid to the constructing of new rate schedules, the rate which will get the business should be known.

(c) There will be some processes where gas may be sold at the existing rates when all the items which may be charged in the final cost of the product are added. Most factory managers can be easily persuaded to change their methods if you can demonstrate to them that by so doing they will show a saving over their present methods.

(d) There will be some processes where gas can be sold, but due to the fact that new costly equipment is necessary to the introduction of gas, the customer must put any such action off in the future. While this proves to be a barrier to the selling of gas immediately, yet this class of potential business will be obtained in due time and should be closely followed.

Results of Survey

The results of such a survey will enable you to plan on a very definite basis. You will inquire whether it is not possible to reduce rates for industrial purposes and still get a reasonable return. You will see more clearly the great needs for publicity, research and co-operation with the manufacturers of equipment, etc., and then, and not until then, will you get a clear view of the entire situation.

In almost all heat processes gas is the most expensive fuel to use if we take only fuel costs into consideration. But the manufacturer is interested in the final cost of his product, which includes, besides the cost of the fuel, a number of other items such as the cost of labor, spoilage, space, etc. In most cases the cost of the fuel is at best only a few per cent of the final cost of the finished product. Professor Trinks made a statement at a recent meeting of the American Society of Mechanical Engineers to the effect that the average fuel cost in the ferrous industries is about 1 per cent of the final cost of the product. Suppose, then, the first cost of gas is two or three times more expensive than oil, for example, will not a lower percentage of rejects quickly make up this difference? Such points as these are brought out in a cost study. We are prone to talk too generally of the advantages of gas. We speak, for example, of the superior control, but very few factory executives can visualize this factor in terms of actual dollars and cents saved. Whether you get industrial gas business or not depends altogether on whether you can show a saving by using gas. It is a cold proposition of dollars and cents and

the same appeals you make in selling gas to domestic customers cannot be made to the industrial manager. It is for this reason, coupled with the fact that the average industrial manager does not know his own costs, that cost studies are essential.

Rate Schedules

It is high time that more attention be given to the matter of rate schedules. The acquisition of much of the available business is dependent on proper rates and unless we can offer rates which are really commensurate with the cost of serving we are going to continue to deprive ourselves of a great lot of business which by its nature is essentially gas business. Certainly, a large industrial consumer using a million cubic feet per month is entitled in most every case to a rate which is more than 10 or 15 per cent better than a domestic customer using two or three thousand cubic feet per month, yet the number of rate schedules which make such a state of affairs possible is legion. One of the crying needs of the gas industry today is an equitable system of rate schedules.

Gas Must Be Used in Specially Designed Furnaces

A mistake that we often fall into is to apply gas in the same way that the fuel we are trying to displace is being applied. This is often the case when the customer has a large investment in equipment which he cannot wipe off the books. For example, in trying to displace oil in a furnace, we often propose simply taking out the oil burners and replacing these with gas burners. The question of whether some other form of furnace or some other method of doing the work would not be far superior and show up gas in a decidedly better light is too often overlooked or lost sight of. We too often apply gas to the furnaces built for crude fuels. While we are often tempted to do this, due to the expense involved in installing the new equipment, yet in the long run it almost always proves to be a mistake, both from the standpoint of the gas company and the customer. In selling gas it is of first importance that it be burned in the most efficient manner. Otherwise you are simply opening yourself to an attack from a competitive fuel in which the latter has little difficulty in proving its superiority. Remember always that you are selling a high priced and highly refined fuel and that such a fuel should only be used in connection with the best built equipment, designed primarily to burn gas. Applying gas in any other way will only show it off to disadvantage.

Proper Furnace Design Essential to Success

The importance of carefully developed appliances for the use of gas is being more and more recognized by the gas industry. Undoubtedly we are handicapped by the absence of a General Electric Company or Westinghouse Electric & Manufacturing Company to whom we could turn for a solution of our problems. In spite of the real advancement made in this direction by some of the manufacturers of gas appliances, a tremendous amount of work remains to be done. None of the industrial gas appliance manufacturers have sufficient resources to carry on this work properly so that the movement inaugurated this year among the gas companies to provide for a research fund for this work constitutes a decided step forward. Our competitors are spending millions in an effort to put more efficient appliances in the field. We cannot leave it up to the appliance manufacturers. We are to be the beneficiaries of this movement and it is our responsibility and problem. We must meet it squarely. We must continually bear in mind that our progress in this field is very closely linked up with the manufacturers of industrial gas equipment and each should have a sympathetic understanding of the problems of the other.

Holding the Installation

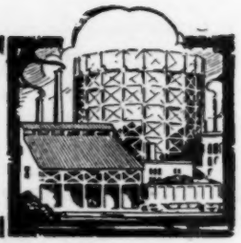
It is just as important to hold an installation as it is to sell a new one. Our present customers should therefore be told of all new developments that affect them and urged to replace their equipment with more efficient equipment as it is developed. The inroads which our competitors have made are in no small measure due to the fact that they replaced obsolete gas equipment with their most modern equipment. These cases are too often made use of to compare two fuels; in reality this is simply a comparison between an obsolete and a modern furnace. Advising customers to install more efficient equipment, in spite of the fact that this will mean lower gas consumption, besides tending to hold the customer on gas, results in the management having more confidence in us and goes far toward winning the good will of the customer.

Publicity

We have been very much lacking in the matter of publicity. Few factory managers understand what has been and can be accomplished with gas as a fuel. A comparison of the amount of money spent by the gas industry to popularize gas for industrial purposes with the tremendous sums spent by our competitors is truly a sad commentary on the gas industry. But even here we have reason to feel encouraged by the start, small as it is, made by the American Gas Association in the field of national industrial gas advertising. We should take full advantage of every opportunity to tell our story to the public. This may be done by the spoken as well as the written word and most companies have ample opportunity to tell the story of gas through the medium of some speaker before Chambers of Commerce, Rotary and Kiwanis clubs, engineering societies, etc.

Such matters as surveys, rate schedules, research and publicity are big subjects and worthy of much more attention than my time permits. I have just hit the "high spots," but we cannot underestimate their importance, for they are part and parcel of a successful campaign to get the industrial gas business. They are vital subjects and the future of our industry will be in no small way determined by how much attention we give them. If the industry is to have a glorious future they cannot be neglected.

NEWS OF THE GAS INDUSTRY



Jersey Gas Men Meet in Camden

Mid-Year Gathering Well Attended—Interesting Papers Read

On Friday, January 22, 1926, in the new Walt Whitman Hotel, at Camden, N. J., the New Jersey Gas Association held its mid-year meeting. The meeting was brought to order by the president, H. D. Whitcomb, of Newark, N. J.

In his opening address, the president welcomed the gas men to Camden and reviewed in some detail the outstanding present problems and developments in the gas industry. He mentioned first the tendency toward lower B.t.u. gas and the important results that this will have for the gas industry. The house heating business and its effect on the gas company's load and the need for obtaining additional business to keep the added winter equipment busy during the summer time were discussed and the important new development in the use of gas in refrigeration was mentioned.

Many Problems Touched Upon

The use of soft coal in the water gas machine was emphasized as being important in freeing the gas industry from dependence on anthracite coal. The importance of the Cottrell process in dehydrating tar, the building of waterless holders, the effect of synthetic ammonia competition on the sale of ammonia liquor, were also stressed. It will eventually become necessary for the gas industry to sell its ammonia liquor to a neighboring sulphate of ammonia plant.

While most of the gas lighting load has gone, the street lighting load is still properly a gas load, and the gas companies were urged to give it due consideration. Among other important developments mentioned were regular drills in prone pressure resuscitation and customer ownership of gas company securities.

New Members Elected

At this meeting 183 new members were elected to the association and President Humphries, of the Stevens Institute of Technology, on motion by Mr. Hanlon, was elected an honorary member of the New Jersey Gas Association.

W. Griffen Gribbel Speaks on Meters

The first paper delivered at the morning's meeting was read by W. Griffen Gribbel, of John J. Griffen Co., Philadelphia, Pa. The title of this paper was "The History and Development of the Gas Meter," but in it Mr. Gribbel did not attempt to give a detailed chronological story of the meter, but just discussed the outstanding developments and important features of meter design and use. One characteristic of the meter industry has been the slowness but sureness of development and progress in meter design and construction, with the result that the meter of today is but little different from what it was 75 years ago.

One point brought out was that, because of the increased volume of gas that will be used in the homes in the future, due to the house heating development and the greater use of gas for household purposes other than cooking, the capacity of the meter must increase more rapidly than the meter dimensions. This involves the problem of lubrication.

The Prepayment Meter

Mr. Gribbel brought out in his discussion the position occupied by the prepayment meter in the progress of the gas industry. It was after all most useful to the gas company in introducing its fuel into homes where gas had never before been used and where there was great reluctance to use the newer fuel for fear of the expense that would be incurred. The decline in the use of the prepayment meter was described and its causes analyzed, but it was asserted that even today the prepayment meter has its use and still meets a certain definite demand.

Resolution on Death of S. J. Franklin

The secretary at this point read a resolution on the death of S. J. Franklin, one of the founders of the New Jersey Gas Association, a man of high ideals and great devotion to the cause of gas. Mr. Franklin was mainly instrumental in maintaining the entity of the association in its early trying days. Eulogies were delivered on this gas pioneer by members of the association and the resolution was adopted, the meeting standing in silence for a minute in honor of Mr. Franklin's memory.

Soft Coal in Water Gas Making

The next paper was read by H. H. Ferris, general superintendent of manufacture, Public Service Electric & Gas Co., Newark, N. J., on "Bituminous Coal for Generator Fuel." In this paper Mr. Ferris described the advantages of the use of soft coal in the U. G. I. design of bituminous coal water gas generator characterized by a pier construction.

This very important subject, important in that it is divorcing the gas industry from dependence on anthracite coal, was subjected to considerable discussion, led by C. W. Smythe, of Jersey City, N. J.

An additional paper was presented at this meeting by A. A. Kohr, of the Seaboard Byproducts Co., on the removal of naphthalene from gas and its effect on the heating value of the gas.

Prof. N. C. Miller, of Rutgers University, addressed the meeting and told of the extension work being done on public utility economics and other subjects of interest to the gas employee. Rutgers is now offering extension courses to utility employees.

The Afternoon Meeting

The first speaker at the afternoon meeting was J. P. Leinroth, general industrial fuel representative, Public Service Electric & Gas

Co., Newark, N. J., who read a paper entitled "Selling Gas for Industrial Purposes."

In his paper he emphasized the prime necessity for the gas company executives seeing that industrial gas business is business which is advantageous to the gas company. Surveys and cost studies were indicated as being of highest importance in obtaining and holding industrial gas business. The fact that gas is a more expensive fuel than the others that may be used in the plant is not a controlling factor, for the final cost of the product is what counts and it is often possible to counterbalance this added fuel cost by some other saving. The question of proper rate structure is one that should be given careful attention. Furthermore, it is absolutely necessary if gas is to give the proper results, that the fuel be used in furnaces that are particularly designed for gaseous fuel.

Gas Buying in America

The second speaker on the program was Dr. R. E. Rindfusz, executive secretary of the Periodical Publishing Association of New York City. Dr. Rindfusz spoke on "Changing the Gas Buying Habits of America." In his talk, which was of a highly entertaining and instructive nature, Dr. Rindfusz told of numerous cases of other industries and other industrial associations which effected remarkable increases in their business by either changing the buying habits of the public or taking advantage of such changes through the medium of publicity. He said that he believed that the gas industry could duplicate the results that other industries have obtained and referred particularly to the orange star home idea, provided that sufficient efforts and funds were expended in the advertising undertaking and sufficient time was allowed for results to develop.

The last speaker on the program, Robinson Murray, of the Biddle Advertising Agency, Philadelphia, Pa., delivered a talk on "Merchandizing Your Product."

New Rate Bill in Legislature

Albany, N. Y.—A bill which would revolutionize the entire rate making machinery of the Public Service Commission, in relation to fixing rates, fares and charges to be exacted by public utility corporations in this Sate, was introduced recently by Minority Leaders Downing and Bloch in the Senate and Assembly. The bill adds a new section, 24-a, to the Public Service Commission law, and provides that the commission shall consider the assessed valuation of the properties of the company upon which their income, franchise, corporation and other taxes are based as such information is filed with the State Tax Commission in fixing any rate, fare or charge. It also provides that the commission may go back to all decisions rendered since January 1, 1921, and reopen the same and may give consideration to the assessed valuation of the properties of the corporations. The tax commission is required under the provisions of the bill to furnish all information in its possession to the commission, such information now being confidential and not available to the rate making body.

The bill introduced requires the commission to consider, among other things, the assessed valuations of the company's properties as they are filed with the tax commission and requires the tax commission to turn this information over to assist in making rates. It allows the commission to go back to 1921 and reopen all cases in which it has fixed rates, fares or charges, and if an examination of the assessed valuations of the properties discloses a discrepancy between the basic value accepted by the commission for its determination, then the commission may make a new rate for such utility corporation based on such assessed valuation.

Foxboro Changes Pittsburgh Office

Foxboro, Mass.—The Foxboro Co., Inc., of Foxboro, Mass., makers of indicating, recording and controlling instruments, have announced the change of address of their Pittsburgh office. Formerly located in the Park building, the company have moved this office to what will now be known as the "Foxboro Building," on the corner of Sixth avenue and Grant street. The four upper floors of the building will be utilized for offices and the maintenance of a substantial stock of new instrument equipment, including flow meters, indicating and recording gauges and thermometers, controllers, etc.

Mr. H. S. Gray continues in charge of the company's Pittsburgh branch.

T. B. Wilson Heads Kentucky Utilities Association

Chicago, Ill.—T. B. Wilson, vice-president and general manager of the Louisville Gas & Electric Co., was elected president of the Kentucky Utilities Association at the annual convention held in Louisville, Friday, January 15.

General Gas Acquires Another Unit

New York City.—The Washington, N. J., Gas Co. has been acquired by the New Jersey Power & Light Co., a subsidiary of General Gas & Electric Corp.

The company is the second gas property in recent weeks to come under the same operating management as the New Jersey Power & Light Co., the Boonton, N. J., Gas Light & Improvement Co. having been acquired last month.

P. D. Warren New Home Service Chairman

It has been announced that Mr. P. D. Warren, assistant to the vice-president of the Peoples Gas Light & Coke Co. of Chicago, is the chairman of the Home Service committee for the coming year. We extend to him best wishes for a successful year.

Gas Company Opens Service Department

Terre Haute, Ind.—More than 150 persons participated in the formal opening recently of the new home service department of the Citizens Gas & Fuel Co. and listened to the address of welcome given by John T. Beasley, president of the local company. Mr. Beasley, in his address, stated that the Terre Haute building is the most attractive of any owned by a public utility company in the State and also pointed out that the home service department is the first one to be opened in Indiana.

The new department is in charge of Mrs. Bertha Louise Barnes, an expert in this line of work, who, in addition to directing all the work of the department, also gives free demonstration lectures to the women of Terre Haute on Tuesdays and Fridays. To each lady attending nine out of twelve of these lessons a certificate will be awarded stating that the holder has attended the home service cooking class of the Citizens Gas & Fuel Co. The department has nothing to sell and is conducted for the purpose of offering friendly advice and instructions in cooking, meal planning, economical buying, entertaining and table service and to eliminate the daily drudgery of household duties.

Much interest was shown at yesterday's opening and many women signified their intention of attending the demonstration lectures and getting the utmost out of the department. Refreshments were served to those in attendance.

Conditions Are Better in Wisconsin

Chicago, Ill.—J. P. Pulliam, vice-president and general manager of the Wisconsin Public Service Corporation, which operates in eastern and northeastern Wisconsin, had the following to say regarding his company and the territory it serves:

"General business conditions in the territory served by the Wisconsin Public Service Corporation and its subsidiaries in the year 1925 were good and showed continuing improvement. Every sign points to the continuance of this condition in 1926.

"There is a general note of optimism with all our industries. The farmer has had a good year. The rural business has increased substantially and a further increase can be expected in the year 1926.

"We have provided additional facilities to the end that we may serve our customers in increasing measure. A modern steam generating station is under construction at Green Bay in the heart of our territory which will strengthen our power facilities and provide ample capacity for our increasing demands.

"We are on friendly terms with our patrons. There is a satisfactory understanding between the corporation and its employees. The year 1926 should be a banner year with us."

Record Gas Output

All records were broken recently in the sendout of gas by the gas department of Public Service Electric Co., when 85,900,000 cubic feet were consumed. The next highest record was made January 19, 1924, when the gas sendout was 79,860,000 cubic feet. Although the sendout on the Sunday that it occurred made a record, had the day been a week-day, when industrial load would have been added, the figures would have approximated 90,000,000 cubic feet.

In the Essex Division a new record of 30,683,000 cubic feet was reached, the next highest having been 28,712,000 cubic feet, January 28, 1925. For the entire state there have been two days when above 75,000,000 cubic feet were sent out, January 28 and December 23, both in 1925. The average sendout for a day in the whole system is about 70,000,000 cubic feet.

New Gas Company Organized

The Shannon Gas & Electric Co. has been incorporated by attaches of the Midwest Refining Co., the incorporation under the laws of Colorado and the capitalization placed at $200,000.

The Midwest Refining Co., operators of the Salt Creek oil field of Wyoming, have more natural gas than it is practicable to take care of or any way sufficient as to justify the selling of part of it to the Shannon concern, which will sell it to the cities of Salt Creek, Lavoya and Edgerton, Wyoming. With a splendid natural gas supply it seems reasonable to suppose that a proper canvass will sell many gas ranges. All the cities named are located in the Salt Creek field region.

Gas for Dansville

Warsaw, N. Y.—The New York Central Electric Corporation is building a manufactured gas plant at Dansville which will be used to supplement the natural gas supply, which is insufficient. A rate of $2 a thousand has been agreed upon.

The money the Pavilion Natural Gas Co. has lost in sinking test wells would have built a plant large enough to accommodate this territory, according to a statement made by a well informed public utility man.

Manufactured Gas Sales Make New Record

Official figures made public by the American Gas Association show that the manufactured gas companies of the United States sold 421 billion cubic feet of gas in 1925, a new high record.

This is an increase of 16 billion cubic feet over 1924, and a five-year increase of 100 billion cubic feet. In the last 10 years sales of gas have more than doubled.

Steady expansion of plant and distribution facilities during 1925 enabled the 984 gas companies in the country to connect 403,000 new customers to their lines, making a total of 10,600,000 customers as of December 31, 1925. Total population served by gas companies is now 52,000,000.

While both domestic and industrial uses of gas show steady in-

creases, the use of gas in industry alone has shown a gain of 1,000 per cent during the last 10 years, with the trend distinctly upward at the present time. A large increase has also taken place in the heating of homes by gas, a development that will be largely accelerated if the anthracite strike continues. The increase in gas-fired house heating systems has averaged more than 2,000 per cent since 1919. New installations are being made at the rate of 10,000 a year.

Out of more than 9,000,000 meters actively in service during 1925, only 3,232 were in receivership. Sales of securities by gas companies to their employees and customers in 1925 were 32 per cent over those of the preceding year, while the number of purchasers increased 85 per cent.

ASAC Automatic Safety Pilot at Own Your Home Show

Taking advantage of the prominent part played by gas in the household, the Automatic Safety Appliance Corporation of New York City will have an exhibit featuring their ASAC Automatic Pilot Control—similar to the attractive display they had at the A. G. A. convention last fall—at the "Own Your Home" Exposition, to be held in the New Madison Square Garden, New York City, during the week of February 20-27 next.

Pacific Lighting Buys Turlock Gas Plant

Modesto, Calif.—Sale of the Turlock Gas Co. to the Pacific Lighting Corp. of San Francisco has been announced. The consideration is said to have exceeded $100,000. A. A. Caldwell, of Turlock, and Edward McGillvray, of Los Angeles, owned the Turlock company jointly.

The Pacific Lighting Corp. recently took over the Madera Gas Co.'s holdings. The plan, it is said, is to supply natural gas to Madera and Turlock consumers from the deposits in the Tulare lake region.

It is known that an attempt has been made to purchase the Modesto Gas Co. to complete the chain, but Frank Cressey, Jr., president of that corporation, had refused all offers, he said.

Bill Affecting Holding Co. in N. Y. Legislature

Albany, N. Y.—A bill which would particularly affect holding companies chartered under the laws of Delaware and other states to acquire stock of utility corporations has been introduced in the Assembly by Walter S. Gedney, Republican, of Rockland County. Mr. Gedney last year electrified insurance circles by the introduction of a bill calculated to compel life insurance companies to return the unearned premium on death of the insured.

The measure introduced by Mr. Gedney adds a new subdivision to Section 111, Stock Corporation Law, requiring foreign corporations doing business in this State to file with the Secretary of State waiver of any right it may lawfully have to secure change of venue to Federal courts in proceedings brought in any court of this State.

Majority of Students Enrolling in Gas Correspondence Course Are College Trained

An analysis of the large enrolment in the Home Study Course on Manufactured Gas offered by Columbia University under the auspices of the Committee on Education of Gas Company Employees of the American Gas Association, presents much food for thought. The judgment of the committee that such a course was needed has proved correct in view of the large number of enrolments received by the university.

The committee is to be congratulated on the splendid arrangements which it made with one of the leading educational institutions of the country, in other words, trained educators, to supply the crying need within the industry for a correspondence course covering the technical phases of the manufacture, distribution and utilization of gas. The course affords an opportunity to employees of the industry not in a position to take advantage of full-time courses to improve their technical knowledge of the business they have chosen for their livelihood.

On January 9, 1926, there were 790 students enrolled from 168 gas companies, 11 appliance or equipment manufacturing companies and 3 public utility commissions, located in 34 states, Canada, England and Japan—truly a wide distribution. There are apparently no women enrolled.

The question naturally arises as to how these men are equipped to study the course. The answer is interesting. The percentage having had the opportunity of a college or university education is 63—surprisingly high. Twenty-seven per cent have attended high school and only 10 per cent with no high school education have tackled the course. Surely it can be inferred from this that the gas industry is recruiting its future executives largely from the higher educational institutions.

Of the 497 who have had college preparation, 34 did not specify the institutions they attended. The remaining 463 attended 146 different institutions. The institutions having eight or more of their students enrolled in the Manufactured Gas Course are: Brooklyn Polytechnic Institute, Cornell University, University of Chicago, University of Colorado, University of Illinois, Iowa State College, Lehigh University, University of Michigan, Massachusetts Institute of Technology, Pratt Institute, Purdue University, University of Pennsylvania, Stevens Institute of Technology, Syracuse University and University of Wisconsin.

The companies having the largest number of employees studying the course are: Peoples Gas Light & Coke Co., 66; Consolidated Gas Co. of New York and affiliated companies, 64; Brooklyn Union Gas Company, 60; Public Service Electric & Gas Co., 42; Public Service Co. of Colorado, 32; and Milwaukee Gas Light Co., 23.

John S. Fees Returns to Gas Business

His many friends will no doubt be glad to welcome Sid Fees back to the gas business after an absence of three years.

Mr. Fees joined the sales organization of Roberts & Mander Stove Co., Philadelphia, manufacturers of Quality gas ranges and appliances, on January 1. He will cover the

states of New York (exclusive of the metropolitan district), Pennsylvania, Delaware and Maryland.

Mr. Fees wishes to take this opportunity to send greetings to his friends and to advise that he will immediately start to renew his relations and expects to see them all personally in a very short time.

Natural Gas Output in 1924 Sets New Record

The consumption of natural gas in the United States in 1924 amounted to 1,141,482,000,000 cubic feet, the highest on record according to the Bureau of Mines. The figure represents an increase of 13 per cent above natural gas consumption in 1923 and is almost double the 1914 consumption. The estimated value of the natural gas at the wells was $105,770,000, and at points of consumption $253,830,000. Production of natural gas in the country in 1924 amounted to 1,141,321,000,000 cubic feet, the slight increase over consumption figures being due to a small consumption in Canada and Mexico of natural gas produced in the United States.

Increased production, as measured by deliveries to consumers, is recorded for most of the states, and in California, Louisiana and Texas gains are recorded ranging between 33 and 58 billion cubic feet; but decreased output of natural gas as contrasted with 1923 is recorded in West Virginia, Pennsylvania, Ohio and Montana. West Virginia passed from first rank among the natural gas producing states, which rank it held since 1909, to third place, and Pennsylvania receded from fourth to sixth place. These changes mark the passing supremacy of the Eastern states in the production of natural gas and a closer approach in the rank of the natural gas producing states to those that produce petroleum, and emphasize the increasing use of casing-head gas—the gas obtained from oil wells.

Gas Men Save Boy from Drowning

Walter Young, 9 years old, of Darby, Pa., had a narrow escape recently when, coasting down a hill on his express wagon near the Darby works of the Delaware County Division of the Philadelphia Suburban Gas & Electric Co., he lost control of the wagon.

The wagon sped down the hill and across the ice, which covered Darby Creek, and as he reached the center the ice gave way, dropping the lad and wagon into the creek, which at this point is about six feet deep. His screams were heard at the office of the gas works and William E. Lafferty, storeroom assistant, responded. He reached the creek after the boy disappeared under the water and ice and in order to save him crawled out on the surface of the ice on his hands and knees. His weight, however, was too great, the ice broke and Lafferty fell through.

Edward Lucke, assistant foreman of Darby distribution, arrived by this time and jumped into the creek and, with the aid of Mr. Lafferty, the lad was pulled out of the water, carried up the hill to the gas office and there Mr. Lafferty gave the boy the Schaeffer-Prone Method. After 10 or 15 minutes' work the lad showed signs of life.

The gas company's physician, Dr. Lenox Dick, was called on the telephone and immediately responded. Upon seeing the boy's condition he had his clothing removed, the water drained from his lungs and then continued the Schaeffer Method.

After a half hour the boy became conscious, was wrapped in blankets and taken to his home by Dr. Dick and is now reported as having resumed his studies at school.

The young man owes his life to the quick action of Lafferty and Lucke of the gas company, as well as to other employees of the company who assisted them.

Mr. Munyan has had considerable operating experience in the construction, maintenance and operation of various sizes and types of coal and water gas apparatus and on steam boilers of various types using a number of different kinds of fuel. His experience with coal, coke and oil in steam boiler plants, in gas plants and in electric generating plants will probably be very valuable to him and to his company in his new connection.

Mr. Munyan has been active in the Purchasing Agents Association and is a member of the executive committee of the Public Utility Section of the National Association of Purchasing Agents. He is also a member of the American Gas Association and has a wide acquaintance among gas and electric officials throughout the country.

Ralph Crosman Promoted

Chicago, Ill.—Ralph Crosman, who for the last four years has been connected with the bond department of H. M. Byllesby & Co., under O. G. Corns, sales manager for Chicago and all Western offices, has been appointed assistant sales manager. Mr. Crosman has been in the investment banking field for about 15 years, having been associated with the sales organizations of Merrill, Cox & Co., Howard, Simmons & Co., investment bankers of Chicago and New York, and the Merchants Loan & Trust Co. of Chicago, before joining the Byllesby organization.